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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/716,632	11/20/2003	Kazufumi Sato	2003_1687	6339

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EXAMINER

THORNTON, YVETTE C

ART UNIT	PAPER NUMBER
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1752

DATE MAILED: 02/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/716,632

Applicant(s)

SATO ET AL.

Examiner

Yvette C. Thornton

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 November 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 4-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1 and 4-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. 09/521205.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

This is written in reference to application number 10/716632 filed on November 20, 2003 and published as US 2004/0072103 A1 on April 15, 2004.

Response to Amendment

1. Claims 2-3 have been cancelled. Claims 1 and 4-10 are currently pending.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1 and 4-10 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for the use of "amine compounds", does not reasonably provide enablement for "an amino compound" as set forth in the instant claims. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims. Hackh's Chemical Dictionary defines "amino" as "the monovalent basic -NH₂ group indicated by the prefix amino or suffix amine". It is unclear to the examiner if the applicant is claiming a subgenus of the broadly disclosed amine group. For clarity, the examiner suggests changing the term "amino" in the claims to -amine-. For the purposes of examination, the examiner has applied the broadest definition available.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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5. Claims 1 and 4-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hatakeyama (US 5750309 A). Hatakeyama teaches a chemically amplified positive resist composition comprising an organic solvent, a resin and a photoacid generator (abstract). The said resin comprises at least two polyhydroxystyrene polymers of the given formula (1) having different molecular weights and some of the hydroxyl groups are protected by an acid labile group. Suitable acid labile groups include linear or branched alkyl groups having 1-8 carbon atoms (i.e., t-butyl, cyclohexyl); alkoxyalkyl groups of the given formula (2) (i.e., ethoxyethyl, t-butoxyethyl); alkoxyacetyl or alkoxyacetylalkyl groups of the given formula (3) (i.e., t-butoxyacetyl); tetrahydropyranyl groups and tetrahydrofuranyl groups (c. 3, l. 16-64). It is the examiner's position that the t-butyl, t-butoxyacetyl, tetrahydropyranyl, tetrahydrofuranyl, and 1-ethoxyethyl all meet the limitations of instant claim 4. In the given formula (1), the letters p and q are such numbers that $p/(p+q)$ is at least 0.05 and represents the degree of protective group substitution (c. 3, l. 65-c. 4, l. 2). The ratio of the high molecular weight polymer (Mw_1) to the lower molecular weight polymer (Mw_2) is at least 1.5/1 (c. 1, l. 51-c. 2, l. 14). Hatakeyama teaches that with a Mw_1/Mw_2 below 1.5 the advantages of improved resolution and minimized edge roughness are lost (c. 4, l. 16-18). It is the examiner's position that the claimed ranges of substituted and unsubstituted hydroxy groups fall within the taught limitations of having a $p/(p+q)$ of at least 0.05 (i.e., 5%). Hatakeyama teaches that if the value or $p/(p+q)$ is less than 0.05 an unsatisfactory profile is obtained. Specifically, example E4 teaches a one resin having a 9% degree of substitution and another having a 25% degree of substitution. Thereby establishing a one resin having a higher degree of substitution than the other. Table 1 exemplifies the use of a high molecular weight polymer and a low molecular weight polymer made of the said polymer thereby giving a mixture wherein the same acid labile groups substitute both polyhydroxystyrene resins. Thereby providing motivation to one of ordinary skill to make the acid labile group of the first polyhydroxystyrene identical to that of the second polyhydroxystyrene resin.

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6. One of ordinary skill in the art would have been motivated by the teachings of Hatakeyama to develop a photoresist composition comprising at least two different polyhydroxystyrene polymers having different molecular weights wherein the hydroxyl groups are partially substituted with acid labile groups such as t-butyl, t-butoxycarbonyl, tetrahydropyranyl and ethoxyethyl wherein the ratio of Mw1 to Mw2 is below 1.5/1 with the expectation that the advantages of improved resolution and minimized edge roughness are lost.

7. Hatakeyama further teaches that the resist composition may be formulated as a chemically amplified positive resist composition comprising the taught polyhydroxystyrenes, an organic solvent, a photoacid generator and optionally a dissolution inhibitor (c.4, l. 37-42). The photoacid generator may be selected from well known ones including onium salts, sulfonates and diazosulfones. Preferred are onium salts, for example triphenylsulfonium triflates and triphenylsulfonium tosylates (c. 4, l. 66-c. 5, l. 6). Triphenylsulfonium triflate (CF_3SO_3^-) meets the limitations of an onium salt compound of which the anionic counterpart is a C_1 halogenalkylsulfonate anion as set forth in instant claim 1. Hatakeyama also teaches that the said composition may further contain various additives such as nitrogenous compounds for improving environmental stability. Typical nitrogenous compounds are amine and amide compounds having a boiling point of 150 degrees or higher (c. 5, l. 19-40). It is the examiner's position that the said nitrogenous compounds meet the limitations of the claimed amino compound.

Response to Arguments

8. Applicant's arguments filed November 22, 2004 have been fully considered but they are not persuasive. Applicants argue that the components of amended claim 1 are neither disclosed nor suggested by the cited prior art. The examiner respectfully disagrees. As discussed above, Hatakeyama clearly teaches that the resist composition of the taught invention comprises a photoacid generator selected from well known ones including onium salts, sulfonates and diazosulfones. Preferred are onium salts, for example triphenylsulfonium triflates and triphenylsulfonium tosylates (c. 4, l. 66-c. 5, l. 6). It is the

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examiner's position that triphenylsulfonium triflate (CF_3SO_3^-) meets the limitations of an onium salt compound of which the anionic counterpart is a C_1 halogenalkylsulfonate anion as set forth in instant claim 1. Hatakeyama also teaches that the said composition may further contain various additives such as nitrogenous compounds for improving environmental stability. Typical nitrogenous compounds are amine and amide compounds having a boiling point of 150 degrees or higher (c. 5, l. 19-40). It is the examiner's position that the said nitrogenous compounds meet the limitations of the claimed amino compound.

9. Applicants argue that the comparative data of the declaration filed November 20, 2003 shows superior results. The examiner maintains the position that the said data is not commensurate in scope with the claimed invention. While the claims have been amended to include the preferred acid generator and amine compound, the Declarant has shown only compositions using a mixture of polyhydroxystyrene (PHS) resins. For example comparative experiment 1 of the declaration exemplifies a resin component (A) prepared using a first mixture (1) of a PHS resin having a weight average weight of 16,000 of which 45% were substituted by tert-butyloxycarbonyl groups and a PHS resin having a weight average weight of 16,000 of which 20% were substituted by tert-butyloxycarbonyl groups and a second mixture (2) of a PHS resin having a weight average weight of 10,000 of which 45% were substituted by 1-ethoxyethyl groups and a PHS resin having a weight average weight of 10,000 of which 25% were substituted by 1-ethoxyethyl groups. The $M_{w_{\max}}/M_{w_{\min}}$ ratio was determined between mixture (1) and mixture (2). The claims as written require two PHS resins (A1) and (A2) having the same acid-dissociable substituent groups wherein A1 has a larger degree of substitution than A2 and the ratio of $M_{w_{\max}}$ to $M_{w_{\min}}$ is at least 1.5. The comparative data appears to be different than the claimed invention. While the present claims do not prohibit the use of a resin mixture, it does require that the substituents be the same. In other words, the comparative data should have a resin mixture (1) having the same substituents as the resin

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mixture (2). Therefore, the comparative data is not commensurate in scope with the claimed invention and the examiner cannot make a direct comparison between the claimed invention and the cited prior art.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

11. A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yvette C. Thornton whose telephone number is 571-272-1336. The examiner can normally be reached on Monday-Thursday 8-6:30.

13. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia H. Kelly can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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14. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Yvette Clarke Thornton
Primary Examiner
Art Unit 1752

yct
February 8, 2005